

SEQUENCE LISTING

&lt;110&gt; E. I. du Pont de Nemours and Company

&lt;120&gt; Plant Diacylglycerol Acyltransferases

&lt;130&gt; BB1295

&lt;140&gt;

&lt;141&gt;

&lt;150&gt; 60/110,602

&lt;151&gt; 1998-12-02

&lt;150&gt; 60/127,111

&lt;151&gt; 1999-03-31

&lt;160&gt; 26

&lt;170&gt; Microsoft Office 97

&lt;210&gt; 1

&lt;211&gt; 1888

&lt;212&gt; DNA

&lt;213&gt; Arabidopsis thaliana

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 Gly Arg Gly Asn Ala Asp Ala Thr Phe Thr Tyr Arg Pro Ser Val Pro  
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 Lys Gln Ser His Ala Gly Leu Phe Asn Leu Cys Val Val Val Leu Ile  
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 Pro Leu Phe Met Cys Trp Ile Ser Leu Ser Ile Phe Pro Leu Ala Ala  
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 Gly Ile Phe Leu His Ile Ile Ile Thr Met Thr Glu Val Leu Tyr Pro  
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WO 00/32756

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 Phe Thr Gly Phe Met Gly Phe Ile Ile Glu Gln Tyr Ile Asn Pro Ile  
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 Val Arg Asn Ser Lys His Pro Leu Lys Gly Asp Leu Leu Tyr Ala Ile  
 340 345 350  
 Glu Arg Val Leu Lys Leu Ser Val Pro Asn Leu Tyr Val Trp Leu Cys  
 355 360 365  
 Met Phe Tyr Cys Phe Phe His Leu Trp Leu Asn Ile Leu Ala Glu Leu  
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 385 390 395 400  
 Ser Val Gly Asp Tyr Trp Arg Met Trp Asn Met Pro Val His Lys Trp  
 405 410 415  
 Met Val Arg His Ile Tyr Phe Pro Cys Leu Arg Ser Lys Ile Pro Lys  
 420 425 430  
 Thr Leu Ala Ile Ile Ile Ala Phe Leu Val Ser Ala Val Phe His Glu  
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 Gly Ile Met Phe Gln Val Pro Leu Val Phe Ile Thr Asn Tyr Leu Gln  
 465 470 475 480  
 Glu Arg Phe Gly Ser Thr Val Gly Asn Met Ile Phe Trp Phe Ile Phe  
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 Phe Asn Asn Leu Val Ser Asp Pro Ala Thr Thr Cys Phe His Ile Leu  
 35 40 45  
 Phe Thr Thr Phe Glu Ile Val Tyr Pro Val Leu Val Ile Leu Lys Cys  
 50 55 60  
 Asp Ser Ala Val Leu Ser Gly Phe Val Leu Met Phe Ile Ala Cys Ile  
 65 70 75 80  
 Val Trp Leu Lys Leu Val Ser Phe Ala His Thr Asn His Asp Ile Gly  
 85 90 95  
 Lys Leu Ile Thr Ser Gly Lys Lys Val Asp Asn Glu Leu Thr Ala Ala  
 100 105 110  
 Gly Ile Asp Asn Leu Gln Xaa Pro Thr Leu Gly Ser Leu Thr Tyr Phe  
 115 120 125  
 Lys Met Ala Pro Thr Leu Cys Tyr Gln Ala Lys Val Ile Leu Arg Thr  
 130 135 140  
 Pro Tyr Val Arg Lys Gly Trp Leu Val Arg Gln Val Ile Leu Tyr Leu  
 145 150 155 160  
 Ile Phe Thr Gly Leu Gln Gly Phe Ile Ile Glu Gln Tyr Ile Asn Pro  
 165 170 175  
 Ile Val Val Asn Ser Gln His Pro Leu Met Gly Gly Leu Leu Asn Ala  
 180 185 190  
 Val Glu Thr Val Leu Lys Leu Ser Leu Pro Asn Val Tyr Leu Trp Leu  
 195 200 205  
 Cys Met Phe Tyr Cys Leu Phe His Leu Trp Leu Asn Ile Leu Ala Glu  
 210 215 220  
 Ile Leu Arg Phe Gly Asp Arg Glu Phe Tyr Lys Asp Trp Trp Asn Ala  
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Lys Thr Ile Asp Glu Tyr Trp Arg Lys Trp Asn Met Pro Val His Lys  
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 Trp Ile Val Arg His Ile Tyr Phe Pro Cys Met Arg Asn Gly Ile Ser  
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 Lys Glu Val Ala Val Phe Ile Ser Phe Phe Val Ser Ala Val Leu His  
                     275                    280                    285  
 Glu Tyr Val Leu Leu Phe Leu His Ile Leu Lys Phe Trp Ala Phe Leu  
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 Gly Ile Met Leu Gln Ile Pro Leu Ile Ile Leu Thr Ser Tyr Leu Lys  
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 Asn Lys Phe Ser Asp Thr Met Val Gly Asn Met Ile Phe Trp Phe Phe  
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 Phe Cys Ile Tyr Gly Gln Pro Met Cys Val Leu Leu Tyr Tyr His Asp  
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                     20                    25                    30

Ile Val Val Asn Ser Gln His Pro Leu Met Gly Gly Leu Leu Asn Ala  
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 Val Glu Thr Val Leu Lys Leu Ser Leu Pro Asn Val Tyr Leu Trp Leu  
 50 55 60  
 Cys Met Phe Tyr Cys Leu Phe His Leu Trp Leu Asn Ile Leu Ala Glu  
 65 70 75 80  
 Ile Leu Arg Phe Gly Asp Arg Glu Phe Tyr Lys Asp Trp Trp Asn Ala  
 85 90 95  
 Lys Thr Ile Asp Glu Tyr Trp Arg Lys Trp Asn Met Pro Val His Lys  
 100 105 110  
 Trp Ile Val Arg His Ile Tyr Phe Pro Cys Met Arg Asn Gly Ile Ser  
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 <212> PRT  
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 35 40 45  
 Ile Leu Phe Thr Thr Phe Glu Ile Val Tyr Pro Val Leu Val Ile Leu  
 50 55 60  
 Lys Cys Asp Ser Ala Val Leu Ser Gly Phe Val Leu Met Phe Ile Ala  
 65 70 75 80  
 Cys Ile Val Trp Leu Lys Leu Val Ser Phe Ala His Thr Asn His Asp  
 85 90 95  
 Ile Arg Lys Leu Ile Thr Ser Gly Lys Lys Val Asp Asn Glu Leu Thr  
 100 105 110  
 Ala Ala Gly Ile Asp Asn Leu Gln Ala Pro Thr Leu Gly Ser Leu Thr  
 115 120 125  
 Tyr Phe Met Met Ala Pro Thr Leu Cys Tyr Gln Pro Ser Tyr Pro Arg  
 130 135 140  
 Thr Pro Tyr Val Arg Lys Gly Trp Leu Val Arg Gln Val Ile Leu Tyr  
 145 150 155 160  
 Leu Ile Phe Thr Gly Leu Gln Gly Phe Ile Ile Glu Gln Tyr Ile Asn  
 165 170 175  
 Pro Ile Val Val Asn Ser Gln His Pro Leu Met Gly Gly Leu Leu Asn  
 180 185 190  
 Ala Val Glu Thr Val Leu Lys Leu Ser Leu Pro Asn Val Tyr Leu Trp  
 195 200 205  
 Leu Cys Met Phe Tyr Cys Leu Phe His Leu Trp Leu Asn Ile Leu Ala  
 210 215 220  
 Glu Ile Leu Arg Phe Gly Asp Arg Glu Phe Tyr Lys Asp Trp Trp Asn  
 225 230 235 240  
 Ala Lys Thr Ile Asp Glu Tyr Trp Arg Lys Trp Asn Met Pro Val His  
 245 250 255



Lys Trp Ile Val Arg His Ile Tyr Phe Pro Cys Met Arg Asn Gly Ile  
 260 265 270  
 Ser Lys Glu Val Ala Val Phe Ile Ser Phe Phe Val Ser Ala Val Leu  
 275 280 285  
 His Glu Val Thr Tyr Leu Leu Phe His Ser Ser Ser Ala Tyr Ile Asn  
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&lt;220&gt;

&lt;221&gt; UNSURE

&lt;222&gt; (148)

&lt;220&gt;

&lt;221&gt; UNSURE

&lt;222&gt; (164)

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&lt;222&gt; (193)

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&lt;220&gt;

&lt;221&gt; UNSURE

&lt;222&gt; (274)

&lt;400&gt; 10

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Tyr Gly Asn Tyr Val Asp Pro Glu Asn Met Lys Asp Pro Thr Phe Lys  
 35 40 45

Ser Leu Val Tyr Phe Met Leu Ala Pro Thr Leu Cys Tyr Gln Pro Thr  
 50 55 60

Tyr Pro Gln Thr Thr Cys Ile Arg Lys Gly Trp Val Thr Gln Gln Leu  
 65 70 75 80

Ile Lys Cys Val Val Phe Thr Gly Leu Met Gly Phe Ile Ile Glu Gln  
 85 90 95

Tyr Ile Asn Pro Ile Val Lys Asn Ser Lys His Pro Leu Lys Gly Asn  
 100 105 110

Phe Leu Asn Ala Ile Glu Arg Val Leu Lys Leu Ser Val Pro Thr Leu  
 115 120 125

Tyr Val Trp Leu Cys Met Phe Tyr Cys Phe Phe His Leu Trp Leu Asn  
 130 135 140

Ile Val Ala Xaa Leu Leu Cys Phe Gly Asp Arg Glu Phe Tyr Lys Asp  
 145 150 155 160

Trp Trp Asn Xaa Lys Thr Val Glu Glu Tyr Trp Arg Met Trp Asn Met  
 165 170 175

Pro Val His Lys Trp Ile Ile Arg His Ile Tyr Phe Pro Cys Ile Arg  
 180 185 190

Xaa Gly Phe Ser Arg Gly Val Ala Ile Leu Ile Ser Phe Leu Val Ser  
 195 200 205

Ala Val Phe His Glu Ile Cys Ile Ala Val Pro Cys His Ile Phe Lys  
210 215 220

Phe Trp Ala Phe Ser Gly Ile Met Phe Gln Ile Pro Leu Val Phe Leu  
225 230 235 240

Thr Arg Tyr Leu His Ala Thr Phe Lys His Val Met Val Gly Asn Met  
245 250 255

Ile Phe Trp Phe Phe Ser Ile Val Arg Gln Pro Met Xaa Cys Leu Tyr  
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Asn Xaa His Asp Val Met Lys Gln Ala Arg Pro Ser Lys  
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<212> DNA  
<213> Oryza sativa

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<212> PRT  
<213> Oryza sativa

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1 5 10 15

Pro Val His Arg Lys Ala Lys Glu Ser Pro Leu Ser Ser Asp Ala Ile  
20 25 30

Phe Lys Gln Ser His Ala Gly Leu Phe Asn Leu Cys Ile Val Val Leu  
35 40 45

Val Ala Val Asn Ser Arg Leu Ile Ile Glu Asn Leu Met Lys Tyr Gly  
50 55 60

Leu Leu Ile Arg Ala Gly Phe Trp Phe Asn Asp Lys Ser Leu Arg Asp  
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<210> 13  
<211> 1587  
<212> DNA  
<213> Oryza sativa

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caggcctttt caacctatgc attgttggtc tagttgcagt gaacagcagg ctattatcgc 180  
agaacttaat gaagtatggc ttattaataa gagctgggtt ttgggttaat gataaatcat 240  
tgcgggactg gccacttcta atgtgttgct ttagtctgcc tgctttcccc ctgggtgcat 300  
ttgcagttga aaagttggca tttaacaatg ttattactga tgctgttgct acctgcctcc 360

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tatcttttgc acatacaaac catgatataa ggcaactgac catgggcggc aagaaggttg 540
ataatgaact aagcacagtt gacatggata atttacaacc tccaacttta gggaatctaa 600
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 <212> PRT  
 <213> *Oryza sativa*

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 35 40 45  
 Pro Arg Gly Gly Asp Ser Asn Gly Arg Ser Val Leu Arg Pro Gly Gly  
 50 55 60  
 Gly Gly Gly Arg Gly Gly Gly Gly Asp Phe Ser Ala Phe Thr Phe Arg  
 65 70 75 80  
 Ala Ala Ala Pro Val His Arg Lys Ala Lys Glu Ser Pro Leu Ser Ser  
 85 90 95  
 Asp Ala Ile Phe Lys Gln Ser His Ala Gly Leu Phe Asn Leu Cys Ile  
 100 105 110  
 Val Val Leu Val Ala Val Asn Ser Arg Leu Ile Ile Glu Asn Leu Met  
 115 120 125  
 Lys Tyr Gly Leu Leu Ile Arg Ala Gly Phe Trp Phe Asn Asp Lys Ser  
 130 135 140  
 Leu Arg Asp Trp Pro Leu Leu Met Cys Cys Leu Ser Leu Pro Ala Phe  
 145 150 155 160  
 Pro Leu Gly Ala Phe Ala Val Glu Lys Leu Ala Phe Asn Asn Val Ile  
 165 170 175

Thr Asp Ala Val Ala Thr Cys Leu His Ile Phe Leu Ser Thr Thr Glu  
 180 185 190  
 Ile Val Tyr Pro Val Leu Val Ile Leu Lys Cys Asp Ser Ala Val Leu  
 195 200 205  
 Ser Gly Phe Leu Leu Ile Phe Ile Ala Cys Ile Val Trp Leu Lys Leu  
 210 215 220  
 Val Ser Phe Ala His Thr Asn His Asp Ile Arg Gln Leu Thr Met Gly  
 225 230 235 240  
 Gly Lys Lys Val Asp Asn Glu Leu Ser Thr Val Asp Met Asp Asn Leu  
 245 250 255  
 Gln Pro Pro Thr Leu Gly Asn Leu Ile Tyr Phe Met Met Ala Pro Thr  
 260 265 270  
 Leu Cys Tyr Gln Pro Ser Tyr Pro Arg Thr Ser Cys Val Arg Lys Gly  
 275 280 285  
 Trp Leu Ile Arg Gln Ile Ile Leu Tyr Leu Ile Phe Thr Gly Leu Gln  
 290 295 300  
 Gly Phe Ile Ile Glu Gln Tyr Ile Asn Pro Ile Val Val Asn Ser Gln  
 305 310 315 320  
 His Pro Leu Lys Gly Gly Leu Leu Asn Ala Val Glu Thr Val Leu Lys  
 325 330 335  
 Leu Ser Leu Pro Asn Val Tyr Leu Trp Leu Cys Met Phe Tyr Ala Phe  
 340 345 350  
 Phe His Leu Trp Leu Ser Ile Leu Ala Glu Ile Leu Arg Phe Gly Asp  
 355 360 365  
 Arg Glu Phe Tyr Lys Asp Trp Trp Asn Ala Lys Thr Ile Asp Glu Tyr  
 370 375 380  
 Trp Arg Lys Trp Asn Met Pro Val His Lys Trp Val Val Arg His Ile  
 385 390 395 400  
 Tyr Phe Pro Cys Met Arg Asn Gly Ile Ser Lys Glu Val Ala Val Leu  
 405 410 415  
 Ile Ser Phe Leu Val Ser Ala Val Leu His Glu Ile Cys Val Ala Val  
 420 425 430  
 Pro Cys Arg Ile Leu Lys Phe Trp Ala Phe Leu Gly Ile Met Leu Gln  
 435 440 445  
 Ile Pro Leu Ile Val Leu Thr Ala Tyr Leu Lys Ser Lys Phe Arg Asp  
 450 455 460  
 Thr Met Val Gly Asn Met Ile Phe Trp Phe Phe Phe Cys Ile Tyr Gly  
 465 470 475 480  
 Gln Pro Met Cys Leu Leu Leu Tyr Tyr His Asp Val Met Asn Arg Ile  
 485 490 495

Glu Lys Ala Arg  
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<210> 15  
<211> 1942  
<212> DNA  
<213> Glycine max

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cttcaattcg cctgagacaa ccaccgacag ttccgggtgat gacttggcca aggattctgg 180  
ttccgacgac tccatcaaca ggcacgacgc cgcgcgtcaat tcccaacagc aaaacgaaaa 240  
acaagacact gattttctccg tccctcaaatt cgcctaccgt ccttccgtcc ccgctcaccg 300  
caaagtgaag gaaagtccgc tcagctccga cactattttc cgtcagagtc acgcgggcct 360  
cttcaacctt tgtatagtag tccttggtgc tgtgaatagc cgactcatca ttgagaattt 420  
aatgaagtat ggttggttga tcaaactctgg cttttggttt agttcaaagt cattgagaga 480  
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ggagaagttg gcacaacgga agtggtatacc cgaaccagtt gttgtgttac ttcataataat 600  
cattacctca acttcgcttt tctatccagt tttagttatt ctcagggtgtg attctgcttt 660  
tgtatcaggt gtcacgttaa tgcgtgtttc ttgtgttgta tgggttaaaat tgggtgtctta 720  
tgcacataca aactatgata tgagagcact taccaaaatta gttgaaaagg gagaagcact 780  
gctcgatact ctgaacatgg actatcctta caacgtaagc ttcaagagct tggcatattt 840  
cctggttgcc cctacattat gttaccagcc aagctatcct cgcacacctt atattcgaaa 900  
gggttggttg tttcgccaac ttgtcaagct gataatattt acaggagtta tgggatttat 960  
aatagaccaa tatattaatc ccatagtaca aaattcacag catcctctca agggaaacct 1020  
tctttacgcc accgagagag ttctgaagct ttctgttcca aatttatatg tgtggctctg 1080  
catgttctat tgctttttcc acccttggtt aaatatcctg gcagagcttc ttcgatttgg 1140  
tgatcgtgaa ttctacaagg attggtggaa tgccaaaact gtcgaagatt attggaggat 1200  
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tcaggttcct ttggtcttga tcaactaatta tctgcaaaat aaattcagaa actcaatggt 1440  
tggaatatg attttttggg tcatattcag tatecttggt caacctatgt gtgtactgct 1500  
atactaccat gacttgatga ataggaaagg caaacttgac tgaagctacg gccattacat 1560  
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gaattccacg ggatatgcca gttcacgagg ctaattcatt atcttgatct atgtacttac 1740  
caactctcct ctggcaattg tatcaaaata tgcaattttg agagccatác actggcattg 1800  
ataactgcca aggaacactc taactgtttt ctgttaactg ttaattagta gagggctaga 1860  
tgtaaatggt ttatgctcaa tatatttatt tctctctaaa aaaaaaaaaa aaaaaaaaaa 1920  
aaaaaaaaaa aaaaaaaaaa aa 1942

<210> 16  
<211> 504  
<212> PRT  
<213> Glycine max

<400> 16  
Met Ala Ile Ser Asp Glu Pro Glu Ser Val Ala Thr Ala Leu Asn His  
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20 25 30  
Asn Ser Pro Glu Thr Thr Thr Asp Ser Ser Gly Asp Asp Leu Ala Lys  
35 40 45

WO 00/32756

Asp Ser Gly Ser Asp Asp Ser Ile Asn Ser Asp Asp Ala A Val Asn  
 50 55 60  
 Ser Gln Gln Gln Asn Glu Lys Gln Asp Thr Asp Phe Ser Val Leu Lys  
 65 70 75 80  
 Phe Ala Tyr Arg Pro Ser Val Pro Ala His Arg Lys Val Lys Glu Ser  
 85 90 95  
 Pro Leu Ser Ser Asp Thr Ile Phe Arg Gln Ser His Ala Gly Leu Phe  
 100 105 110  
 Asn Leu Cys Ile Val Val Leu Val Ala Val Asn Ser Arg Leu Ile Ile  
 115 120 125  
 Glu Asn Leu Met Lys Tyr Gly Trp Leu Ile Lys Ser Gly Phe Trp Phe  
 130 135 140  
 Ser Ser Lys Ser Leu Arg Asp Trp Pro Leu Phe Met Cys Cys Leu Ser  
 145 150 155 160  
 Leu Val Val Phe Pro Phe Ala Ala Phe Ile Val Glu Lys Leu Ala Gln  
 165 170 175  
 Arg Lys Cys Ile Pro Glu Pro Val Val Val Val Leu His Ile Ile Ile  
 180 185 190  
 Thr Ser Thr Ser Leu Phe Tyr Pro Val Leu Val Ile Leu Arg Cys Asp  
 195 200 205  
 Ser Ala Phe Val Ser Gly Val Thr Leu Met Leu Phe Ser Cys Val Val  
 210 215 220  
 Trp Leu Lys Leu Val Ser Tyr Ala His Thr Asn Tyr Asp Met Arg Ala  
 225 230 235 240  
 Leu Thr Lys Leu Val Glu Lys Gly Glu Ala Leu Leu Asp Thr Leu Asn  
 245 250 255  
 Met Asp Tyr Pro Tyr Asn Val Ser Phe Lys Ser Leu Ala Tyr Phe Leu  
 260 265 270  
 Val Ala Pro Thr Leu Cys Tyr Gln Pro Ser Tyr Pro Arg Thr Pro Tyr  
 275 280 285  
 Ile Arg Lys Gly Trp Leu Phe Arg Gln Leu Val Lys Leu Ile Ile Phe  
 290 295 300  
 Thr Gly Val Met Gly Phe Ile Ile Asp Gln Tyr Ile Asn Pro Ile Val  
 305 310 315 320  
 Gln Asn Ser Gln His Pro Leu Lys Gly Asn Leu Leu Tyr Ala Thr Glu  
 325 330 335  
 Arg Val Leu Lys Leu Ser Val Pro Asn Leu Tyr Val Trp Leu Cys Met  
 340 345 350  
 Phe Tyr Cys Phe Phe His Leu Trp Leu Asn Ile Leu Ala Glu Leu Leu  
 355 360 365

Arg Phe Gly Asp Arg Glu Phe Tyr Lys Asp Trp Trp Asn Ala Lys Thr  
 370 375 380  
 Val Glu Asp Tyr Trp Arg Met Trp Asn Met Pro Val His Lys Trp Met  
 385 390 395 400  
 Ile Arg His Leu Tyr Phe Pro Cys Leu Arg His Gly Leu Pro Lys Ala  
 405 410 415  
 Ala Ala Leu Leu Ile Ala Phe Leu Val Ser Ala Leu Phe His Glu Leu  
 420 425 430  
 Cys Ile Ala Val Pro Cys His Ile Phe Lys Leu Trp Ala Phe Gly Gly  
 435 440 445  
 Ile Met Phe Gln Val Pro Leu Val Leu Ile Thr Asn Tyr Leu Gln Asn  
 450 455 460  
 Lys Phe Arg Asn Ser Met Val Gly Asn Met Ile Phe Trp Phe Ile Phe  
 465 470 475 480  
 Ser Ile Leu Gly Gln Pro Met Cys Val Leu Leu Tyr Tyr His Asp Leu  
 485 490 495  
 Met Asn Arg Lys Gly Lys Leu Asp  
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 <212> DNA  
 <213> Glycine max

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 actccatcag cagcgacgcc gccaatcgc aaccgcaaca aaaacaagac actgatttct 240  
 ccgtcctcaa attcgccctac cgtccttcgc tccccgctca tcgcaaagtg aaggaaagtc 300  
 cgctcagctc ccgacaccat tttccgctcag aagtcacgcg gggcctcttc aacctcctgt 360



atagtaagtc cntgttgctg tgaataagcc gactcatcat tgagaatttt aaatgaaata 420  
 tggnttggtg tgatcaaacc cnggcntttt gggtaaagct caaagtcant 470

<210> 18  
 <211> 38  
 <212> PRT  
 <213> Glycine max

<400> 18  
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Arg Lys Val Lys Glu Ser Pro Leu Ser Ser Asp Thr Ile Phe Val Arg  
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Ser His Ala Gly Pro Leu  
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<210> 19  
 <211> 646  
 <212> DNA  
 <213> Triticum aestivum

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 agctgggttt tggtttaagt gcaagatcgc tgggagattg gccacttctg atgtgctgcc 180  
 tcactttacc cattttccca cttgctgctc tcatgaccgg agaattgggt caaaagaaan 240  
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 ctatccgggtg ntgtgatcct taaagtgtga accacantat atcctgggtt gtgnttatgt 360  
 ccattgcaan atacttgggt gancttgncc cttttgctcc atacaattag atataagtat 420  
 tgnccccc aaa ntatngaaag ggtgctacac agggattcta ccnagaagaa aattaaagcc 480  
 caactncaac aagtgtgtat cangttggcc caacactggg acaaccaatt taccggcan 540  
 attatanaaa ggtggtcacc ggaactataa agtgtatttt aagcttatgg ctcaaattggc 600  
 ataataacca ttggnatca acacatgacg aanttttgnc atgaaa 646

<210> 20  
 <211> 39  
 <212> PRT  
 <213> Triticum aestivum

<400> 20  
 Ser Asp Ala Ile Phe Arg Gln Ser His Ala Gly Leu Leu Asn Leu Cys  
 1 5 10 15  
 Ile Val Val Leu Ile Ala Val Asn Ser Arg Leu Ile Ile Glu Asn Leu  
 20 25 30

Met Lys Tyr Gly Leu Leu Ile  
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<210> 21  
<211> 1975  
<212> DNA  
<213> Triticum aestivum

<220>  
<221> unsure  
<222> (93)

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cccagaccgg caccctcccc gcagcttcct cccctccac ggcgggccgc caccgaaacc 180  
caaaaccccg ccccgaaact tccggaacct cccctccagt tccacccatg gccccgcccc 240  
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gccgacggtc cagcgagagg cggcgcatgg agcagccgca gcggcacgac gagatgccct 360  
gctaccggggc gtccggcgccg cccaccgccc ggtcaaggag agcccgtta gctccgacgc 420  
catcttccga cagagccatg caggtcttct gaatctatgc attgttgtgc tgattgcagt 480  
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cattttccca cttgctgctc tcatgaccga gaagtgggct caaagaaagc tcatccgtga 660  
tcatgtgtct attcttctcc atataattat tacaaccact gtcccttatct atccggttgt 720  
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caaaacagtt gaagagtact ggagaatgtg gaatatgcct gttcataagt ggatcgttcg 1320  
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tcaagataag ttcaagaata caatgggtgg caacatgata ttttggttct tcttcagcat 1560  
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gcccagggca atggaggggc ggctcctta atgtttcgcc atgggctgtt agagcttgc 1740  
atgctacgaa tccaagtttg tcagcatgat atgttccaat ccgttccagt tagctcgtg 1800  
cgttccaaat gtatgatatg cggcgccggg tgtgtaccga agatacccca gtgatgaagc 1860  
cgaagataac acgacctgcc acatgtgtt tgtgtatacg tttcggttca tgtgccagca 1920  
gagttacgta cgtgatgccc tggttgatat aaagtgtacg tgccgtatga aaaaa 1975

<210> 22  
<211> 508  
<212> PRT  
<213> Triticum aestivum

<400> 22  
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1 5 10 15  
Ser His Gly Gly Pro Pro Pro Lys Pro Lys Thr Pro Pro Arg Thr Phe  
20 25 30

Arg Asn Leu Pro Ser Ser Ser Thr His Gly Pro Ala Pro Ser Val Ala  
 35 40 45  
 Ala Ala Thr Ile Ala Thr Thr Pro Pro Ser Ala Ser Ala Ala Pro Leu  
 50 55 60  
 Pro Pro Thr Val His Gly Glu Ala Ala His Gly Ala Ala Ala Ala Ala  
 65 70 75 80  
 Arg Arg Asp Ala Leu Leu Pro Gly Val Gly Ala Ala His Arg Arg Val  
 85 90 95  
 Lys Glu Ser Pro Leu Ser Ser Asp Ala Ile Phe Arg Gln Ser His Ala  
 100 105 110  
 Gly Leu Leu Asn Leu Cys Ile Val Val Leu Ile Ala Val Asn Ser Arg  
 115 120 125  
 Leu Ile Ile Glu Asn Leu Met Lys Tyr Gly Leu Leu Ile Arg Ala Gly  
 130 135 140  
 Phe Trp Phe Ser Ala Arg Ser Leu Gly Asp Trp Pro Leu Leu Met Cys  
 145 150 155 160  
 Cys Leu Thr Leu Pro Ile Phe Pro Leu Ala Ala Leu Met Thr Glu Lys  
 165 170 175  
 Trp Ala Gln Arg Lys Leu Ile Arg Asp His Val Ser Ile Leu Leu His  
 180 185 190  
 Ile Ile Ile Thr Thr Thr Val Leu Ile Tyr Pro Val Val Val Ile Leu  
 195 200 205  
 Lys Cys Glu Ser Ala Val Leu Ser Gly Phe Val Leu Met Phe Ile Ala  
 210 215 220  
 Ser Ile Thr Trp Leu Lys Leu Val Ser Phe Ala His Thr Asn Tyr Asp  
 225 230 235 240  
 Ile Arg Ile Leu Ser Gln Ser Ile Glu Lys Gly Ala Thr His Gly Ser  
 245 250 255  
 Ser Ile Asp Glu Glu Asn Ile Lys Gly Pro Thr Ile Asn Ser Val Val  
 260 265 270  
 Tyr Phe Met Leu Ala Pro Thr Leu Cys Tyr Gln Pro Ser Tyr Pro Arg  
 275 280 285  
 Thr Ala Phe Ile Arg Lys Gly Trp Val Thr Arg Gln Leu Ile Lys Cys  
 290 295 300  
 Val Val Phe Thr Gly Leu Met Gly Phe Ile Ile Glu Gln Tyr Ile Asn  
 305 310 315 320  
 Pro Ile Val Gln Asn Ser Lys His Pro Leu Asn Gly Asn Phe Leu Asp  
 325 330 335  
 Ala Ile Glu Arg Val Leu Lys Leu Ser Val Pro Thr Leu Tyr Val Trp  
 340 345 350

Leu Cys Met Phe Tyr Ser Phe Phe His Leu Trp Leu Asn Ile Leu Ala  
 355 360 365

Glu Leu Leu Arg Phe Gly Asp Arg Glu Phe Tyr Lys Asp Trp Trp Asn  
 370 375 380

Ala Lys Thr Val Glu Glu Tyr Trp Arg Met Trp Asn Met Pro Val His  
 385 390 395 400

Lys Trp Ile Val Arg His Ile Tyr Phe Pro Cys Ile Arg Asn Gly Leu  
 405 410 415

Ser Lys Gly Cys Ala Ile Leu Ile Ala Phe Leu Val Ser Ala Val Phe  
 420 425 430

His Glu Leu Cys Ile Ala Val Pro Cys His Ile Phe Lys Leu Trp Ala  
 435 440 445

Phe Ser Gly Ile Met Phe Gln Ile Pro Leu Leu Phe Leu Thr Lys Tyr  
 450 455 460

Leu Gln Asp Lys Phe Lys Asn Thr Met Val Gly Asn Met Ile Phe Trp  
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Phe Phe Phe Ser Ile Val Gly Gln Pro Met Cys Val Leu Leu Tyr Tyr  
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His Asp Val Met Asn Arg Gln Ala Gln Thr Asn Gly  
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<210> 23

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<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR primer

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20

<210> 24

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<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence:PCR primer

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33

<210> 25

<211> 497

<212> PRT

<213> Mus musculus

<400> 25

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Arg Val Ser Val Gln Gly Gly Ser Gly Pro Lys Val Glu Glu Asp Glu  
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 Val Arg Asp Ala Ala Val Ser Pro Asp Leu Gly Ala Gly Gly Asp Ala  
 35 40 45  
 Pro Ala Pro Ala Pro Ala Pro Ala His Thr Arg Asp Lys Asp Gly Arg  
 50 55 60  
 Thr Ser Val Gly Asp Gly Tyr Trp Asp Leu Arg Cys His Arg Leu Gln  
 65 70 75 80  
 Asp Ser Leu Phe Ser Ser Asp Ser Gly Phe Ser Asn Tyr Arg Gly Ile  
 85 90 95  
 Leu Asn Trp Cys Val Val Met Leu Ile Leu Ser Asn Ala Arg Leu Phe  
 100 105 110  
 Leu Glu Asn Leu Ile Lys Tyr Gly Ile Leu Val Asp Pro Ile Gln Val  
 115 120 125  
 Val Ser Leu Phe Leu Lys Asp Pro Tyr Ser Trp Pro Ala Pro Cys Val  
 130 135 140  
 Ile Ile Ala Ser Asn Ile Phe Val Val Ala Ala Phe Gln Ile Glu Lys  
 145 150 155 160  
 Arg Leu Ala Val Gly Ala Leu Thr Glu Gln Met Gly Leu Leu Leu His  
 165 170 175  
 Val Val Asn Leu Ala Thr Ile Ile Cys Phe Pro Ala Ala Val Ala Leu  
 180 185 190  
 Leu Val Glu Ser Ile Thr Pro Val Gly Ser Val Phe Ala Leu Ala Ser  
 195 200 205  
 Tyr Ser Ile Met Phe Leu Lys Leu Tyr Ser Tyr Arg Asp Val Asn Leu  
 210 215 220  
 Trp Cys Arg Gln Arg Arg Val Lys Ala Lys Ala Val Ser Thr Gly Lys  
 225 230 235 240  
 Lys Val Ser Gly Ala Ala Ala Gln Gln Ala Val Ser Tyr Pro Asp Asn  
 245 250 255  
 Leu Thr Tyr Arg Asp Leu Tyr Tyr Phe Ile Phe Ala Pro Thr Leu Cys  
 260 265 270  
 Tyr Glu Leu Asn Phe Pro Arg Ser Pro Arg Ile Arg Lys Arg Phe Leu  
 275 280 285  
 Leu Arg Arg Val Leu Glu Met Leu Phe Phe Thr Gln Leu Gln Val Gly  
 290 295 300  
 Leu Ile Gln Gln Trp Met Val Pro Thr Ile His Asn Ser Met Lys Pro  
 305 310 315 320  
 Phe Lys Asp Met Asp Tyr Ser Arg Ile Ile Glu Arg Leu Leu Lys Leu  
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Val

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<211> 520
<212> PRT
<213> Arabidopsis thaliana
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Gly Gly Glu Phe Val Asp Leu Asp Arg Leu Arg Arg Arg Lys Ser Arg
      20              25              30
Ser Asp Ser Ser Asn Gly Leu Leu Leu Ser Gly Ser Asp Asn Asn Ser
      35              40              45
Pro Ser Asp Asp Val Gly Ala Pro Ala Asp Val Arg Asp Arg Ile Asp
      50              55              60
Ser Val Val Asn Asp Asp Ala Gln Gly Thr Ala Asn Leu Ala Gly Asp
      65              70              75              80
Asn Asn Gly Gly Gly Asp Asn Asn Gly Gly Gly Arg Gly Gly Gly Glu
      85              90              95
Gly Arg Gly Asn Ala Asp Ala Thr Phe Thr Tyr Arg Pro Ser Val Pro
      100              105              110

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Ala His Arg Arg Ala Arg Glu Ser Pro Leu Ser Ser Asp Ala Ile Phe  
 115 120 125  
 Lys Gln Ser His Ala Gly Leu Phe Asn Leu Cys Val Val Val Leu Ile  
 130 135 140  
 Ala Val Asn Ser Arg Leu Ile Ile Glu Asn Leu Met Lys Tyr Gly Trp  
 145 150 155 160  
 Leu Ile Arg Thr Asp Phe Trp Phe Ser Ser Arg Ser Leu Arg Asp Trp  
 165 170 175  
 Pro Leu Phe Met Cys Cys Ile Ser Leu Ser Ile Phe Pro Leu Ala Ala  
 180 185 190  
 Phe Thr Val Glu Lys Leu Val Leu Gln Lys Tyr Ile Ser Glu Pro Val  
 195 200 205  
 Val Ile Phe Leu His Ile Ile Ile Thr Met Thr Glu Val Leu Tyr Pro  
 210 215 220  
 Val Tyr Val Thr Leu Arg Cys Asp Ser Ala Phe Leu Ser Gly Val Thr  
 225 230 235 240  
 Leu Met Leu Leu Thr Cys Ile Val Trp Leu Lys Leu Val Ser Tyr Ala  
 245 250 255  
 His Thr Ser Tyr Asp Ile Arg Ser Leu Ala Asn Ala Ala Asp Lys Ala  
 260 265 270  
 Asn Pro Glu Val Ser Tyr Tyr Val Ser Leu Lys Ser Leu Ala Tyr Phe  
 275 280 285  
 Met Val Ala Pro Thr Leu Cys Tyr Gln Pro Ser Tyr Pro Arg Ser Ala  
 290 295 300  
 Cys Ile Arg Lys Gly Trp Val Ala Arg Gln Phe Ala Lys Leu Val Ile  
 305 310 315 320  
 Phe Thr Gly Phe Met Gly Phe Ile Ile Glu Gln Tyr Ile Asn Pro Ile  
 325 330 335  
 Val Arg Asn Ser Lys His Pro Leu Lys Gly Asp Leu Leu Tyr Ala Ile  
 340 345 350  
 Glu Arg Val Leu Lys Leu Ser Val Pro Asn Leu Tyr Val Trp Leu Cys  
 355 360 365  
 Met Phe Tyr Cys Phe Phe His Leu Trp Leu Asn Ile Leu Ala Glu Leu  
 370 375 380  
 Leu Cys Phe Gly Asp Arg Glu Phe Tyr Lys Asp Trp Trp Asn Ala Lys  
 385 390 395 400  
 Ser Val Gly Asp Tyr Trp Arg Met Trp Asn Met Pro Val His Lys Trp  
 405 410 415  
 Met Val Arg His Ile Tyr Phe Pro Cys Leu Arg Ser Lys Ile Pro Lys  
 420 425 430



Thr Leu Ala Ile Ile Ile Ala Phe Leu Val Ser Ala Val Phe His Glu  
435 440 445

Leu Cys Ile Ala Val Pro Cys Arg Leu Phe Lys Leu Trp Ala Phe Leu  
450 455 460

Gly Ile Met Phe Gln Val Pro Leu Val Phe Ile Thr Asn Tyr Leu Gln  
465 470 475 480

Glu Arg Phe Gly Ser Thr Val Gly Asn Met Ile Phe Trp Phe Ile Phe  
485 490 495

Cys Ile Phe Gly Gln Pro Met Cys Val Leu Leu Tyr Tyr His Asp Leu  
500 505 510

Met Asn Arg Lys Gly Ser Met Ser  
515 520